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Mary Cotrell
Secretary
Department of Telecommunications and Energy
1 South Station- 2nd Floor
Boston, MA 02110

D.T.E. 02-38

The following is in response to your request for comments on Docket 02-38, Distributed Generation NOI. We welcome the opportunity to participate in this matter.

Introduction

Aegis Energy Services, Inc. has been in the business of developing and operating small cogeneration systems throughout New England for the past 17 years. We provide economic analyses, engineering, system installation, service, and occasionally ownership with shared savings agreements as a financing vehicle. Aegis primarily uses the Tecogen product, originally developed by Thermo Electron Corporation of Waltham, MA.

These natural gas fired engine-driven electric generating units have an overall efficiency of 84% and are commonly used to provide heat for space heating, domestic hot water, pools, and other thermal processes. When coupled with thermally driven absorption cooling, the device provides energy free cooling as a byproduct in addition to electricity. This represents a double benefit in regards to electrical congestion.

The Tecogen utilizes an induction generator that operates as a slave unit to the utility power system which controls its voltage and frequency. It cannot start up or sustain operation without power for the magnetizing field from the utility. When operating, its electric characteristics are similar to an induction motor, as opposed to a synchronous generator which develops its own magnetic field and is normally used for standby, emergency power systems, or very large generating systems.

The interconnection is simple in that it is connected directly within the customer's electric system. There are no transfer switches and we are always in synch with the utility, as well as being electrically harmless. Because of its electrical simplicity, the units are easily

connected to buildings' electrical systems at various locations and could represent a significant source of power in metropolitan areas with electrical congestion.

Our cogeneration systems (combined heat and power) are typically used in nursing homes, apartment buildings, hospitals, YMCAs, and other facilities where the thermal loads are extensive. These systems are designed primarily for thermal use, but are also able to reject the heat when it is not needed so that electricity can be generated during electrical peaks. The engine turning the generator uses the same fuel that would normally be used in the boilers to only provide heat. These 60 and 75 kW cogenerators are about the size of a large office desk and are typically located deep in the bowels of a building (usually in or near boiler rooms) or on the roof or penthouse facility. They have a 70 decibel sound rating, so noise is not an issue.

Interconnection

In our experience within the Northeast, the most significant problems with utility interconnection requirements are:

- All types and sizes of generator are grouped together
- The utilities have a mindset for synchronous generators and do not understand induction type systems
- Interconnection requirements and standby issues are being used to discourage these systems

Each time a utility adds a requirement, however small it may be, it drives up the cost of a system. For example, NStar has recently required utility grade relay protection for a device which cannot control its own voltage or frequency. The units must operate in a few cycles under the same conditions as a relay device in a utility substation or power plant. They have even withheld net energy billing rates as a means of enforcing these unnecessary requirements. Although previously notified of their installation, the utilities have lost track of the many units already installed with industrial grade relays and operated for years in Nstar's service area without incident.

In some cases, Massachusetts's utilities have informally waived some unnecessary requirements after considerable debate; however, these requirements still remain as part of their documents.

The eastern Massachusetts electrical congestion problem has been further aggravated by Nstar's policy reversal three years ago, denying access for interconnection to the network which serves much of Boston. In prior years (15), interconnection was allowed (Mass. General Hospital, for example). They threatened to shut down any buildings that installed these systems. Installation contracts are now void, and development of new sites has ceased.

During this three year period, Nstar has finally completed a test facility utilizing a costly approach to "protect" the network and which was supposed to provide assurance for later installations. However, the parameters to assess this "Beta" test have not been made available. Furthermore, other utilities (Con Ed, NU) allow network interconnection utilizing very basic, realistic protection.

The development of IEEE 1547 has been dominated by utility-related personnel. As such, we believe it represents the "ultimate" in utility system protection, perhaps at the unnecessary expense of DG. It also appears that some of the utilities in New York have neither accepted nor are they utilizing the new interconnection standards developed for that state. We suggest that the DTE consider interconnection standards which meet the needs of Massachusetts.

Standby Service Rates

Standby Service, or any type of backup charge, should not apply to small, thermally driven cogeneration units. These 60 and 75 kW cogeneration units typically only supply a small portion of the total building load, leaving a substantial supplementary load still served by the utility. This supplementary load often has the same load curve as other facilities on the same rate without cogeneration. Connecticut's Department of Public Utility Control has ruled in several decisions that because these small QF customers' load curve resembles that of other customers on the same rate, it would be discriminatory to force QF's to take service under different rates. They have taken the position that standby rates are optional and QF customers could take back up service as part of their supplemental service under the usual general service firm rates.

The growth of distributive generation has been limited. Current technology does not have economic application in every building. We do not displace all of the electricity being purchased from the utility, nor is that our goal. The cogenerator's primary function is to provide a balance between heat and electricity. We do not sell power back to the grid, with the exception of a few sites that fall under net energy billing. Perhaps net energy billing should be expanded to larger systems, particularly where power generation is provided in conjunction with recovered heat utilization.

There are senior facilities that keep electric kilns on hand for an occasional day on which they do ceramics crafts. These devices are rarely used, but when they are, they can cause a spike in the peak demand of the customer. However, even though this is similar to the load curve of a customer operating a cogenerator that has a malfunction, the customer occasionally turning on the kiln would never be susceptible to a standby rate.
There are a multitude of comparable loads used occasionally that are non-coincidental and melt into the utility's diversity of load, just as the cogeneration load would.

Applying backup charges to these small systems could detrimentally affect the economics and payback of these systems. It appears that Cambridge Light and Electric is currently the only utility in Massachusetts that carries a backup rate. While this rate is obviously intended for larger self generators, if we were to install two 75-kW cogenerators in a facility, we

would have to take this rate. Since the customer and administrative charges are so high, it would substantially reduce savings necessary to successfully fund the project. There will be little hope for future small DG systems or cogeneration projects should any backup charge be imposed. Likewise, many developers and potential users will not even consider these systems if there is any uncertainty concerning backup charges.

DG and Utility Distribution Service

Customers who invest in their own on site generation prolong the useful life of existing utility transmission and distribution systems. This helps reduce utility investment (rate base) for new, larger capacity T&D systems. Therefore, this also results in the lowest possible rates to their customers.

Distributive generation with recovered heat utilization provides real benefits on a continuous basis. It is the most effective means of conservation utilizing heat that central station plants normally discard. Electric conservation funds should become available for these systems with compensation to the electric utility for lost revenues just as they receive with other conservation measures they promote.

A utility typically wants DG used for peak shaving. Small distributive generation without the use of heat recovery, which amortizes the investment, will be difficult to justify. If that is the case, the utility should subsidize this type of installation.

Cogeneration does not add to the gas industry's winter peak since it efficiently provides usable heat. It's summer use as an electric generation unit with an air conditioning byproduct helps utilize surplus gas capacity. However, the capital required for these systems is costly and require financial subsidies for significant growth.

Seasonal use of electric air conditioning exacerbates the problem of transmission and distribution congestion. Central station generation, transmission and distribution capacity must be sized to accommodate high electric demands for a matter of a few hours during a few days of the summer season. Since gas is plentiful during this period, thermally driven absorption and natural gas engine driven cooling should be encouraged by the electric distribution companies. Continued use of conservation rebates for "high efficiency" electric motor driven air conditioning will not help the situation. Perhaps these funds could be allocated to the recommended DG/AC systems.

Enclosed is a current press release from Tecogen relative to the issues. We hope that we have provided some alternative perspectives to some difficult problems the Commonwealth faces.

Sincerely,

Spiro Vardakas
President